Homework # 5, due Wed, Feb 23rd.

For all MATLAB problems, turn in your code (and MATLAB diaries when needed).

1. Create a MATLAB function that inputs a symmetric matrix A and implements the Householder method to reduce it to a tridiagonal matrix. Run it on a random symmetric matrix of order 5.

2. Modify your function from Problem #1 to reduce an arbitrary matrix to a Hessenberg matrix. Run it on a non-symmetric matrix of your choice.

3. Create a function that implements the QR algorithm with shifts as discussed in Burden and Faires' book (see pp. 592–595). Use it to determine, to within 10^{-5}, all eigenvalues of the matrix

$$\begin{bmatrix} 2 & -1 & 0 \\ -1 & -1 & -2 \\ 0 & -2 & 3 \end{bmatrix}.$$